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THE WORLD'S INDUSTRIAL CONSUMPTION OF GOLD

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NOT since the bimetallist controversy of the last century has the industrial consumption of gold received the attention it attracts today. Silver partisans at that time declared that the arts and industries, together with Eastern exports, diverted so much gold from coinage annually that not enough was left for monetary purposes. Following the extraordinary increase in output after 1890, and the later protracted rise in prices, this argument was abandoned. With it went any substantial interest in gold consumption; the attention of writers centered instead on production. Recently this situation has changed. The decline in output since 1915, combined with the need of governments for gold to back currency issues and to repay loans, has caused fresh scrutiny of non-monetary drains on the supply.

Of first importance in this respect is the use of gold industrially. The forms which industrial consumption takes are numerous, and comprise the manufacture of leaf, jewelry, ornaments, watches, plate, pens, spectacles, laces, and fabrics, as well as the use in telephony, telegraphy, photography, radiography, and in surgical instruments, chemicals, and dental supplies.[1] Doubtless among these forms, the manufacture of jewelry and watches and the demands of dentistry require the largest quantities of gold. Data on gross amounts consumed in any or all of these ways, however, do not accurately measure the drain upon monetary supply. Old material such as sweepings, scraps, and discarded jewelry, melted down and re-used from year to year, augments gross consumption but does not diminish the increment available for coinage. To determine this quantity, gold returned from industry for coining or for remanufacture must be deducted from the total amount used. The remainder, representing net consumption, shows the extent to which the arts withdraw gold annually from monetary supply.

Very similar to industrial consumption in its effects is the loss of gold by accident and abrasion. Abrasion has at times occasioned considerable loss. As early as 1911, however, the Director of the Mint pointed out that it was of diminishing importance owing to the greater use of coin as reserve against paper in circulation.[2] If the statement held then, it certainly holds much more in recent years, when the various governments have practically impounded gold. Loss by abrasion, then, appears insignificant today in comparison with industrial consumption.

Important as industrial consumption is, however, estimates of its amount are few. This situation is due largely to the fact that the subject is a difficult one on which to form opinions that are even approximately accurate. Figures must in general be based either on the records of bureaus of guaranty, charged with certifying the quality of gold articles, or on inquiries made among manufacturing concerns that employ gold. While many European countries require jewelry, plate, etc., to be stamped at public bureaus, others, including England, Germany, Belgium, and Italy, either do not have such bureaus or leave resort to them optional.[3] Even for countries where they are maintained, bureaus of guaranty do not afford satisfactory data on the consumption of gold, partly because they have no record of certain uses, such as the scientific, but especially because they do not report the amount of old material used. As for inquiries among manufacturers employing gold, these are not only laborious to undertake, but also yield incomplete returns on account of the number of concerns unwilling or unable to give information. With the original sources of data so inadequate, it is not surprising that few comprehensive and regular estimates of industrial consumption have been attempted.

Among the surveys that have been made, the most notable are those of Adolph Soetbeer, extending from 1831 to 1890, and of the United States Mint, extending in their international scope from 1893 to date. Soetbeer, a strong advocate of the gold standard for Germany, devoted years to gathering statistics of the precious metals. His studies on the use of gold in the arts,[4] which appeared from 1881 to 1891, went so far beyond any previous efforts that they have served as the common starting point for subsequent investigators. They contain estimates not only for the civilized world as a whole, but also for particular countries: the United States, England, France, Russia, Germany, Austria Hungary, Belgium and the Netherlands. For each of these countries Soetbeer's method of procedure differed in detail but was in general the same. After reviewing the opinions of earlier writers,[5] he turned to the reports of concerns producing gold articles and to whatever official sources were available, or lacking these, sought the professional opinion of men engaged in the trade. The official sources comprised stamping bureaus mainly, but not exclusively. In the case of Great Britain, for example, quantities taxed afforded evidence of consumption. For Germany, the number of workmen employed in gold industries served for some time as a satisfactory index, though at a later period Soetbeer compiled figures by districts through reports from factories. He also secured for several countries semi-official estimates made by delegates to international monetary conferences. The conclusions he offered on the basis of data from these various sources refer to averages of several years rather than to figures for particular years. Further, since his interest was in the pressure of industrial consumption on monetary supplies, he made a deduction in each case for old material included in the totals. His results as finally published represent the most careful and exhaustive private inquiry into the subject. In accepting them, nevertheless, his own reservation should be borne in mind, that the industrial use of gold is "ascertainable only with wide limits of error."[1]

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[1] André Touzet, *Emplois industriels des métaux précieux*, p. 24.

[2] Director of the Mint, *Annual Report*, 1911, p. 52.

[3] *Questions monétaires contemporaines: La monnaie et les prix*, Édouard Dolléans, p. 76.

[4] Viz., (1) "Zur Statistik der Edelmetalle in den Jahren 1876 bis 1880," published in Conrad's *Jahrbücher für Nationalökonomie und Statistik*, 1881; (2) "Materials toward the Elucidation of the Economic Conditions Affecting the Precious Metals," 1886, translated by F. W. Taussig and published as Appendix D of Atkinson's *Bimetallism in Europe;* (3) "Edelmetallgewinnung und Verwendung in den Jahren 1881 bis 1890," published in Conrad's *Jahrbücher*, 1891.

[5] For Soetbeer's review of previous writers, see "Zur Statistik," etc., pp. 128–132.

As Soetbeer was the outstanding figure in the earlier period, the United States Mint takes first rank among more recent investigators. As far back as 1880, the Mint began collecting data on our native consumption of the precious metals, with a view to determining the stock of specie on hand. The inquiries for the United States, which will be more fully described later, were supplemented from 1893 on by similar inquiries for foreign countries. The answers received, together with estimates of world consumption, appeared yearly both in the *Report of the Director of the Mint*, and in the *Report on the Production of the Precious Metals*, though the second presented data for foreign countries in more convenient form.[2] To obtain these foreign returns, the Mint employed means already at hand. Our representatives abroad customarily furnished it statements relating to the monetary conditions of the country in which they were located. On the schedule outlining the information desired, the Mint inserted a question on the quantity of gold consumed annually in the arts, and (from 1894) on the proportion of old material thus used. For the first few years, returns were meagre, and the Mint based its world totals largely on the private researches of men like Soetbeer, Haupt, and Lexis. In fact, it has commonly made a practice of supplementing its own data by independent estimates that have come to hand, but these were more numerous in the 90's than they have been since.

This lack of data in the earlier years points to defects in the Mint figures which have persisted. From countries like the South American Republics, where no records on the subject are kept, only the scantiest returns have been made. Figures for other countries, such as England, do not rest on an official basis, and have a large element of uncertainty. Finally, it has frequently happened that total consumption was reported without any statement of the proportion of old material. The Bureau in such cases has sometimes taken the total without change, and at other times made a deduction more or less arbitrary; i.e., based on a return for an earlier year or for other countries of similar rank. In view of so many weak links entering into their formation, the estimates furnished by the Mint cannot be used without caution. Neither can they be put aside, however, as worthless; for they embody certainly the chief inquiry now made into this subject.

One other source besides Soetbeer and the Mint is of sufficient scope to require a word. The French Department of Coins and Medals publishes in its annual report data on the industrial consumption of gold.[3] The figures, which are furnished the Department by various governments, are scattered through the volume without any attempt being made to summarize them. For the countries to which they pertain (chiefly Sweden, Portugal, Austria-Hungary, and Switzerland) they commonly disagree with the American figures. The criticisms leveled against the Mint estimates on this score, however, have taken no account of the fact that the French reports give the total quantity of gold consumed, while the Mint, as a rule, deducts the amount of old material.[4] By failure to make a similar allowance, the figures of the Department of Coins and Medals become inferior to those of the Mint for measuring the withdrawal of gold from monetary supplies. Perhaps the best commentary on the French data is the fact that the Department bases its own discussion of this subject on our Mint figures.

To come now to the presentation of the actual returns for the chief consumers, those countries will be considered first for which more than one extended estimate has been made. In the case of France, for example, the United States Mint and the Department of Coins and Medals offer figures which are related, while quite different results have been published by André Touzet, a French writer.[5] The totals supplied by the Department of Coins and Medals are more reliable for France than for other countries, because more carefully compiled. They rest upon records of the Department showing the quantity of gold which it has put into medals, and upon the responses of manufacturers to a yearly inquiry regarding the quantities they have used for ornaments, watch cases, plate and jewelry, gilding, etc. Although this inquiry extends back to 1879, the results are shown in the accompanying table only for the years 1905–14, because the published figures prior to that time included alloy in varying proportions.[6]

These results, it will be observed, are uniformly higher than our Mint estimates for corresponding years. This difference is to be explained by the fact that the Mint takes the totals for fine gold compiled by the Department of Coins and Medals, but deducts from them an allowance for old material.[7] The Director of the Mint states that this allowance was 20 per cent (the per cent allowed by Soetbeer) prior to 1906, and 25 per cent thereafter,[8] though a comparison of the total and net figures for 1910 and 1912 indicates that more than 25

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[1] "Materials," etc., p. 126.

[2] Since 1910, these two reports have been combined and issued in a single volume.

[3] Administration des monnaies et médailles, *Rapport au Ministre des finances*.

[4] E.g., Édouard Dolléans, *op. cit.*, p. 84.

[5] A. Touzet, *op. cit.*, 1911.

[6] In the latest volume at hand, the amount of fine gold is calculated for 1905–14. See Adm. des m. et m., *op. cit.*, 1914–15, p. 120.

[7] The Director of the Mint has secured the figures in fine gold since 1899. Prior to that year, alloy appears to have been included.

[8] Director of the Mint, *Annual Report*, 1911, p. 50.

TABLE I. — DIVERSE ESTIMATES OF THE INDUSTRIAL CONSUMPTION OF GOLD IN FRANCE, 1893[a]–1914

Unit: $1,000,000

Calendar year	United States Mint[b]	Touzet[c]	Dept. of Coins and Medals, France
1893	7.98	7.24	*e*
1894	9.57	8.38	*e*
1895	10.10	8.88	*e*
1896	10.63	8.98	*e*
1897	10.63	8.99	*e*
1898	12.12	10.47	*e*
1899	14.36	12.27	*e*
1900	13.82	11.96	*e*
1901	14.36	12.97	*e*
1902	11.30	11.12	*e*
1903	12.13	11.58	*e*
1904	13.49	12.99	*e*
1905	14.00	12.41	18.50
1906	13.86	13.62	18.42
1907	15.85	14.69	21.13
1908	14.62	13.58	19.53
1909	17.94	*d*	23.81
1910	16.84	*d*	26.03
1911	17.50	*d*	23.93
1912	17.50	*d*	25.78
1913	*d*	*d*	16.85
1914	9.15	*d*	9.15

a. Soetbeer estimated average annual consumption from 1871 to 1880 at $11,230,000 and from 1881 to 1885 at $11,170,000.

b. The Mint's *Annual Report*, 1880, p. 58, has a table showing industrial consumption in France yearly, 1855–78. It did not seem profitable, however, to reprint the figures here.

c. Touzet's figures extend back to 1880. See *Emplois industriels*, etc., p. 54.

d. Data lacking.

e. Figures for these years include alloy, and are not comparable with the later figures for fine gold.

per cent was subtracted in those years. Except for the refinement introduced by the Mint, then, these two sets of figures correspond.

Not content with either series, however, André Touzet in 1911 adopted a method for improving them.[1] There were in France at that time not more than three houses dealing in the precious metals. Of these the most important was the Comptoir Lyon Alemand, the only French refinery, which practically controlled the industry. It was generally supposed that the sales of this house alone were three times as great as those of the other two firms together. Touzet, on making a test for 1907 and 1908, found that such relationship held for these years if one compared the sales of new gold by the lesser concerns with the total sales of the Comptoir. At the same time, he was informed by officials of this house that its annual sales included about 33 per cent old material. Considering that this per cent was offset by the amount of new material sold by its rivals, Touzet concluded that the gross sales of the Comptoir Lyon Alemand might be taken to measure the industrial consumption of gold in France. The figures which he offers on this conclusion, as shown in the table, fall below the Mint estimates throughout, and more so in some cases than in others. Occasional wide variations may indicate lean years for the Comptoir. That the whole series is on a lower level appears, as a rule, to be the effect of Touzet's deducting for old material a larger per cent than does the Mint. Though these three series as they stand, therefore, differ substantially, the discrepancies are less considerable when the diverse methods followed are taken into account.

Moreover, whatever their difference in level at a particular time, all three agree in trend over the period covered. The industrial consumption of gold in France shows a persistent, if not uniform, upward movement. According to the Mint figures, France consumed 52 per cent more in 1903 than in 1893, and 44 per cent more in 1912 than in 1903. For 1914, the last year for which there are returns, the figures decline abruptly. "The events occurring in the second half of 1914, which necessitated the closing of a large number of industries, explain this diminution."[2] The 1912 consumption, while only half as great as that of the United States, appears from the data available to have been but slightly lower than England's. Industry before the war was evidently making significant and increased demands on the French gold supply.

A similar trend in the case of Germany is indicated by the estimates of the Mint and of Touzet, presented in Table II. Touzet arrived at his estimates for Germany in much the same way that he had for France.[3] By correspondence with all the German refineries — only four in number — he secured their gross sales, three-quarters of which they reported to be new gold.

TABLE II. — DIVERSE ESTIMATES OF THE INDUSTRIAL CONSUMPTION OF GOLD IN GERMANY, 1893–1912

Unit: $1,000,000

Calendar year	United States Mint	Touzet
1893	9.97	*a*
1894	9.97	*a*
1895	8.77	*a*
1896	7.14	*a*
1897	7.14	6.64
1898	7.14	6.35
1899	7.14	9.29
1900	7.14	7.36
1901	7.14	7.30
1902	*a*	6.71
1903	*a*	7.32
1904	*a*	8.61
1905	11.00	10.18
1906	17.00[b]	11.26
1907	19.00	11.68
1908	*a*	11.05
1909	19.00	*a*
1910	19.00	*a*
1911	19.00	*a*
1912	20.00	*a*

a. Data lacking.

b. Computed from data contained in Mint *Report on the Production*, etc., *passim*.

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[1] For what follows, see A. Touzet, *op. cit.*, pp. 58–61.

[2] Adm. des m. et m., *op. cit.*, 1914–15, p. XXVII.

[3] For what follows, see A. Touzet, *op. cit.*, pp. 69–71.

The net figures which he adopted are therefore the combined sales of these houses diminished by one-fourth. It will be noted from the table that the Mint figures for Germany do not vary greatly from year to year, though there is a movement downward in 1896 and strongly upward in 1906. The explanation of this circumstance is that no continuous official data are obtainable for this country. At two different times, however, 1896–97 and 1906–07, the German government investigated the native use of gold in the arts, and the Mint employed for subsequent years the results then obtained. The first inquiry established a larger deduction for old material than had been made in Soetbeer's estimates, which the Mint had quoted previously. The second showed a faster growth in consumption than the Mint had allowed for. This second report, however, appears to have been ambiguous as to the amount of old material consumed; and the wide disagreement in 1906–07 between Touzet and the Mint may indicate that the latter did not make a large enough deduction on this score.

However this may be, Touzet's results confirm those of the Mint in showing that industrial consumption of gold had increased in later years. Germany in 1906 was using in the arts over twice as much gold as in 1896, and from 1909–12 used a somewhat larger aggregate, according to the Mint estimates, than either England or France.

For countries besides France and Germany, there are unfortunately no series with which to compare our government figures. Certain other important European consumers, England, Switzerland, Austria-Hungary, and Russia, are therefore grouped in Table III. For Switzerland, Austria-Hungary, and Russia, the estimates have an official basis. Switzerland has a federal bureau of gold and silver matters, which calculates gold consumption both from the weight of articles stamped and from observations among the trade. Austria and Hungary, where stamping was long obligatory, reported regularly before the war the total quantity of fine gold in the wares marked. Less regular returns from Russia showed the weight of objects presented for stamping and the amount of gold used in the manufacture of medals. For England, however, whose gold consumption far exceeds that of these three countries, there have been no official records adequate for an estimate. Ordinarily the Mint has calculated the quantity consumed in England to be two-thirds more than the weight of the objects taken voluntarily to the imperial assay office for stamping. But where results on this basis have fallen out of accord with returns for comparable countries, they have often been modified "on the strength of what was known about the industrial consumption of the United States, Germany and France."[1] This practice accounts in part for the 39 per cent increase in 1909 over 1908, though this was determined upon also in view of a statement by the assayer of the royal mint that annual consumption had increased after 1905.[2] It is to be regretted that the English estimates have not an official basis at least as solid as that of the countries tabulated with it.

TABLE III. — INDUSTRIAL CONSUMPTION OF GOLD IN OTHER EUROPEAN COUNTRIES FROM 1871

Unit: $1,000,000

Calendar year	England	Switzerland [a]	Austria-Hungary	Russia
Soetbeer's annual averages for:				
1871–1880	11.30	7.44	1.66	1.60
1881–1885	11.30	6.98	1.60	1.60
U. S. Mint Averages for:				
1893	11.30	3.99	1.60	1.60
1894	11.30	4.65	1.60	3.54
1895	10.30	5.92	2.23	2.63
1896	10.30	5.71	2.37	2.72
1897	10.30	5.71	1.87	2.72
1898	14.01	3.99	2.77	2.72
1899	15.17	4.14	2.86	2.83
1900	15.83	4.27	2.46	2.83
1901	19.15	4.19	2.36	2.83
1902	16.62	3.47	2.79	*b*
1903	11.94	4.22	2.43	*b*
1904	13.54	*b*	2.02	*b*
1905	14.50	4.32	1.50	2.50
1906	14.50	8.31	3.13	2.50
1907	14.50	7.31	3.36	5.70
1908	14.50	6.78	3.44	4.82
1909	20.00	7.11	4.24 [c]	2.04
1910	18.00	5.67	5.75	4.00
1911	18.00	7.53	5.75	5.64
1912	18.00	8.00	5.00	5.00
1913	17.21	*b*	*b*	*b*
1914	*b*	7.11	1.44	*b*
1915	16.71	*b*	*b*	*b*

a. Estimates for Switzerland for 1916, 1917 and 1918 respectively are, in millions, 7.98, 7.72 and 7.31. *b.* Data lacking.

c. The Mint, obviously by error, converted the Austrian figures as ounces instead of kilograms. The above is a corrected figure, from which the usual deductions have been made.

Abrupt changes like that referred to for England in 1909 occur also in the case of the other countries. These changes can in some instances be reasonably accounted for. The decline in the Swiss figure of 1898, for example, probably comes because gold consumption was reported separately that year, whereas previous estimates were based on a report for gold and silver combined, and assumed 37 out of 40 parts to be gold. Again, the Russian estimate for 1907 more than doubles that for 1905–06, but the latter when published was described as doubtless too low for normal, but made so because of the disturbed conditions in Russia in 1905.[3] The 1907 figure suffered in part, however, from an inconsistency in method which affected the data for Russia in 1894 and 1908, for England in 1901, and for Switzerland in 1906–09, 1911, and 1914. In all these instances, the Mint made no deduction for old material; and in other cases, as for England in 1902, Switzerland in 1905 and 1912, and Hungary in 1910–11, made a much smaller deduction than usual. Many of the irregularities which will be observed are therefore artificial.

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[1] Director of the Mint, *Annual Report*, 1911, p. 50.

[2] Mint, *Report on the Production*, etc., 1909, p. 32.

[3] *Ibid.*, 1905, p. 34.

Such inconsistencies in the data, whether arising from lack of information or from failure to follow uniform methods, make it unsafe to base too positive conclusions on them. For these countries as a whole, however, as for France and Germany, there seems to have been a somewhat larger industrial use of gold in the decade preceding the war than in the 90's.

An increase of this kind there must have been if industrial demands abroad followed the same course as in our own country. The United States being the largest single consumer, its experience is of particular interest. Fortunately, the employment of gold in the arts is more easily traced here than for other nations, because the government has given more care to recording it. The Bureau of the Mint has issued estimates yearly since 1880. These estimates for the first four or five years rested on censuses among manufacturers using gold, and on reports from the offices of the Mint service relative to the weight of bars sold to the trade. The canvass of individual firms being found too great an undertaking, totals after 1885 were secured by adding to the sales of the Mint offices (1) sales reported by private refineries; and (2) an allowance for coin privately melted down. Practically all the refineries cooperated readily, and reported, as did the public offices, both the number of bars sold and the amount of old plate, jewelry, etc. employed in making them. It was therefore possible to measure quite accurately the value of new gold used by industry.

To check the results obtained in this fashion, however, and to get an idea of the amount of gold coin melted, the circular inquiry to manufacturing jewelers was repeated in 1899, 1900 and 1901. The returns confirmed the estimates on bars, but indicated that the $1,500,000 allowed since 1893 for the destruction of coin was inadequate, $3,500,000 being nearer the fact.[1] The Mint adopted this second figure from 1903 on, and so revised its earlier estimates that the uniform allowance of $3,500,000 for coin destroyed in the arts now extends back to 1885.[2] Whether this amount is at present adequate is a matter of conjecture. Considering that jewelers' bars are of convenient size and not subject to abrasion, the Mint holds that they are in general preferred, and that the use of coins may on this account be supposed not to aggregate more than $3,500,000 annually. It has been recently contended, however, that "in the opinion of many familiar with the jewelry business, the estimates of monetary destruction should not be placed at less than 10 per cent of the actual sales."[3] In the absence of more exact information, the Mint estimates on coin are retained and are included in the totals for "new material" presented in the table below. Without question these totals, as they stand, measure the industrial consumption of new gold more accurately for the United States than it is measured for any other country.

Perhaps in part because they have been compiled uniformly and regularly, the American figures show on

TABLE IV. — PRODUCTION AND INDUSTRIAL CONSUMPTION OF GOLD IN UNITED STATES, 1880–1919

Unit: $1,000,000

Calendar year	Production	INDUSTRIAL CONSUMPTION			Production less consumption of new material
		Total	Old material	New material	
1880	36.00	10.10	1.29	8.81	27.19
1881	34.70	10.57	1.60	8.97	25.73
1882	32.50	10.52	1.80	8.72	23.78
1883	30.00	15.44	1.85	13.58	16.42
1884	30.80	14.50	1.90	12.60	18.20
1885	31.80	11.82	2.17	9.65	22.15
1886	34.87	14.53	3.27	11.26	23.61
1887	33.14	14.81	3.32	11.49	21.64
1888	33.17	16.52	4.05	12.47	20.70
1889	32.97	16.70	4.89	11.81	21.16
1890	32.84	17.66	4.63	13.02	19.82
1891	33.18	19.69	6.62	13.07	20.11
1892	33.02	19.33	5.92	13.41	19.61
1893	35.96	15.44	4.44	11.00	24.96
1894	39.50	12.66	3.85	8.81	30.69
1895	46.61	15.43	4.48	10.95	35.66
1896	53.09	13.40	3.89	9.50	43.58
1897	57.36	13.87	3.64	10.23	47.13
1898	64.46	15.57	3.59	11.98	52.49
1899	71.05	19.85	4.13	15.72	55.34
1900	79.17	22.15	5.09	17.06	62.11
1901	78.67	23.87	5.24	18.63	60.04
1902	80.00	27.68	6.58	21.11	58.89
1903	73.59	29.06	6.46	22.60	50.99
1904	80.46	28.66	7.88	20.78	59.69
1905	88.18	33.21	7.73	25.48	62.71
1906	94.37	39.13	7.24	31.88	62.49
1907	90.44	40.73	9.26	31.47	58.97
1908	94.56	31.48	7.03	24.45	70.11
1909	99.67	37.63	7.38	30.25	69.42
1910	96.27	41.79	7.63	34.16	62.11
1911	96.89	40.83	7.73	33.10	63.79
1912	93.45	43.98	8.11	35.87	57.58
1913	88.88	45.86	8.36	37.50	51.38
1914	94.53	45.52	8.11	37.41	57.12
1915	101.04	37.82	8.22	29.60	71.44
1916	92.59	51.06	9.94	41.12	51.47
1917	83.75	52.92	18.11	34.80	48.95
1918	68.65	52.41	19.52	32.89	35.76
1919	58.49	71.00[a]	19.00[b]	52.00[c]	6.49[c]

a. A preliminary estimate furnished by the Director of the Mint sets the domestic consumption of gold bars in 1919 at $67,593,000. Adding to this $3,500,000 usually allowed for consumption of gold coin gives the above preliminary total.

b. An estimate based on the assumption that the amount of old material used in 1919 approximated that used in the two preceding years. The Mint has not yet reported the 1919 figure. *c.* Preliminary.

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[1] Director of the Mint, *Annual Report*, 1902, pp. 62, 63.

[2] The complete revision was made in the Mint's *Report on the Production*, etc., 1910, p. 305.

[3] *Our Vanishing Gold Reserve*, a pamphlet published by the American Mining Congress, H. N. Laurie, "Gold and Currency Economics," p. 25.

examination a much steadier upward trend than was evidenced in the cases already considered (Table IV). From the late 90's up to 1914 our use of gold grew so rapidly that consumption in 1913 more than doubled that for 1900. Such an increase was of course natural during a time of rising prices, when gold was cheap in terms of other commodities. The only decided break in the upward movement over this period came in 1908, the year following the panic. At the outbreak of the European war, however, there was a halt, succeeded in 1915 by a marked decline. The complete recovery which came with the revival of business in 1916 was not maintained in the two next years; for although total consumption remained about the same, it included so much more old material than formerly that the demand upon new gold was actually less. For 1919, on the contrary, possibly as a reflection of post-war extravagant living, the preliminary estimate that is available indicates a greater use of new gold than ever before recorded.

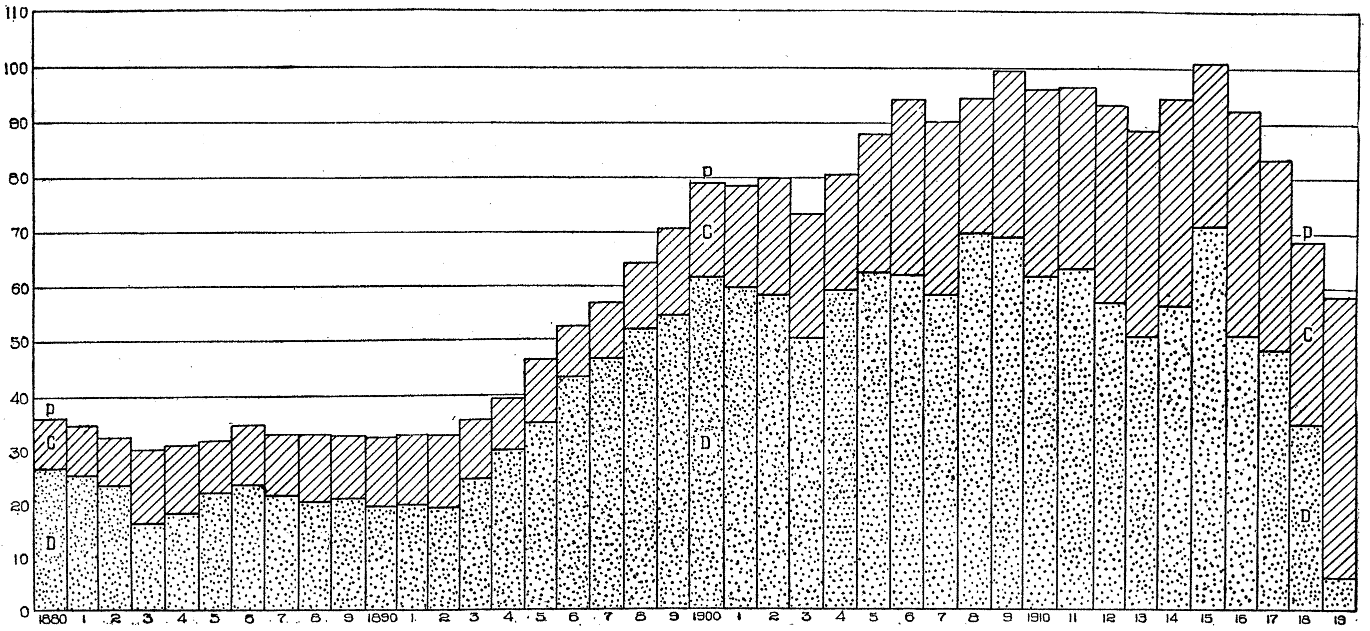
But the amount consumed industrially, however large, is less important than the balance of production left free for monetary purposes. This balance or surplus is represented on Chart A, following, by the dotted area. It is evident that during most of the period considered, industrial consumption has not had the effect of reducing this surplus substantially. In the early 80's, when production had fallen off, the balance did decrease somewhat. From the beginning of the 90's, however, it increased on the whole steadily. In most of the years between 1900 and 1914, the increment to the monetary supply, despite growing demands of industry, came close to $60,000,000. Unusually large output in 1908, 1909, and 1915, combined with comparatively moderate consumption in the first and third years, left the still greater sum of approximately $70,000,000 available for coinage. In the last four years, however, quite the reverse has been true. Production since 1915 has declined so heavily that, even with the lessened consumption of 1917 and 1918, the annual surplus has dwindled to probably not more than $6,500,000 in 1919. In other words, at a time when our bank reserves need to be maintained and enlarged, the contrary movements of gold production and gold consumption seem to be tending toward their diminution.

It would be interesting to know whether these same tendencies are true of the world as a whole. On the side of production, there has been a parallel downward movement. For measuring the world's industrial consumption, however, data are not available later than 1912. In the one or two years preceding the war, the Mint closed its records earlier than usual, and lacking many returns on this account, did not attempt to compile world totals. During the war, reports from the belligerents practically ceased; and for 1919 no estimate has yet been issued. Data up to 1912, however, are significant in showing the trend and the pre-war level of industrial demands. Therefore the compilations of Soetbeer and the Mint, both of which exclude Asia and Egypt, are presented in Table V (p. 154) and Chart B.[1] The Mint series given was revised in 1911 for the whole period preceding.[2]

The world figures, like those for the United States, show that the industrial consumption of gold has expanded greatly during the period reviewed. From a minimum of about $12,000,000, the annual average for the decade 1831–40, it rose in 1912 to a maximum of $124,000,000. Except for rather slight declines in 1902, 1903, and 1908, this increase has been continuous. The

CHART A. — PRODUCTION AND INDUSTRIAL CONSUMPTION OF GOLD IN THE UNITED STATES, 1880–1919

P — Production; C — Consumption of new material; D — Production less consumption.



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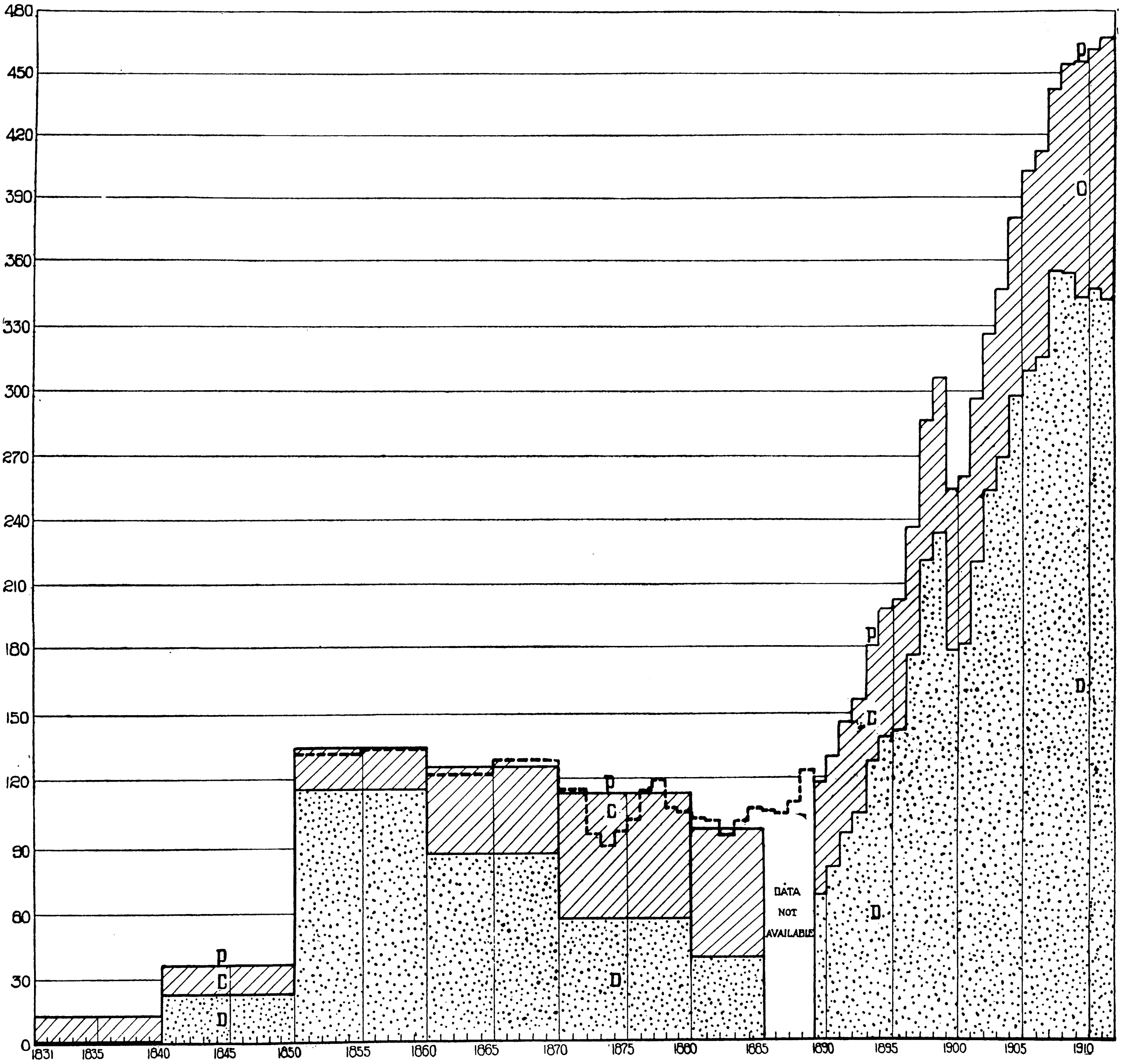
[1] Soetbeer's figures are taken from "Zur Statistik," etc., p. 169, and from "Materials," p. 136. His data are given in kilograms, which have been converted throughout this report at the rate, 1 kg. = $664.6.

[2] Director of the Mint, *Annual Report*, 1911, p. 52.

CHART B. — PRODUCTION AND INDUSTRIAL CONSUMPTION OF GOLD IN THE WORLD, 1831–1912[1]

P — Production; C — Consumption of new material; D — Production less consumption;
------ Production by shorter intervals.



break between Soetbeer and the Mint, when the Mint series opens on a lower level, is probably more artificial than real. The Mint, wishing to be conservative, made low estimates, and stated that they were doubtless too low. The growth generally indicated was consistent with normal increase in population and wealth, and with the relative abundance of gold.

The importance of this consumption in relation to monetary supplies, however, has varied (Chart B). At the time Soetbeer wrote, declining output combined with increased industrial demands had led to such a reduction in the annual surplus that many people doubted whether there was enough metal to permit a single gold standard. From 1890 to 1909 the increase in consumption was more than offset by growth in production, so that except for 1900 and 1901, when output fell off, the excess of production over consumption grew steadily greater. After 1909, a slight reversal occurred. Strong industrial demands lowered the surplus from 1910 to 1912. Whether this effect was simply temporary, or the beginning of a steady reduction, there are no data to show.

The reduction is, however, much more considerable if account is taken of a factor closely connected with the world's industrial consumption of gold; namely, the flow to the East. British India, Egypt, and China withhold from monetary supplies a substantial amount of metal which is not included in the consumption estimates above. For China there are no data covering the period reviewed which are adequate for an estimate. In the case of Egypt, which has the gold standard, it is impossible to distinguish what proportion of specie imports are hoarded, and what proportion are used for

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[1] The production figures for shorter intervals disagree in some cases with the 10-year averages. The difference arises because the latter are Soetbeer's early estimates, while the figures for shorter periods are in part his later revisions and in part United States Mint estimates. Since consumption nearly equaled production from 1831 to 1840, the difference between the two in those years is indicated only by the broader base line.

TABLE V. — PRODUCTION AND INDUSTRIAL CONSUMPTION OF GOLD IN THE WORLD, 1831–1912

Unit: $1,000,000

Calendar year	Production [a]	Consumption of new material	Production less consumption of new material
Soetbeer's annual averages for:			
1831–1840	13.48	11.96	1.52
1841–1850	36.39	13.29	23.10
1851–1860	134.12	18.61	115.51
1861–1870	125.28	37.88	87.40
1871–1880	113.18	55.83	57.36
1881–1885	99.12	59.81	39.30
U. S. Mint estimates for:			
1886	106.16	*b*	*c*
1887	105.78		
1888	110.20		
1889	123.49		
1890	118.85	50.00	68.85
1891	130.65	50.00	80.65
1892	146.65	50.00	96.65
1893	157.50	50.52	106.98
1894	181.18	52.52	128.66
1895	198.76	59.08	139.68
1896	202.25	59.73	142.52
1897	236.07	59.94	176.13
1898	286.88	65.58	221.30
1899	306.72	73.26	233.46
1900	254.58	76.29	178.28
1901	260.99	79.42	181.58
1902	296.74	75.86	220.87
1903	327.70	74.56	253.15
1904	347.38	77.84	269.53
1905	380.29	82.98	297.31
1906	402.50	93.15	309.36
1907	412.97	97.17	315.80
1908	442.84	88.57	354.26
1909	454.06	100.51	353.55
1910	455.24	111.85	343.39
1911	461.98	114.27	347.71
1912	466.14	124.10	342.04

a. Soetbeer's figures for the early period by five-year averages are, in millions of dollars, as follows: 1851–55, 132; 1856–60, 134; 1861–65, 123; 1866–70, 130; 1871–72, 116. The Mint has made these estimates: 1873, 96; 1874, 91; 1875, 98; 1876, 104; 1877, 114; 1878, 119; 1879, 109; 1880, 106; 1881, 103; 1882, 102; 1883, 95; 1884, 102; 1885, 108.

b. In 1891, Soetbeer estimated consumption as between 66 and 80 million dollars. It is not clear, however, whether the estimate pertains to 1889, 1890, or 1881–90. See "Edelmetallgewinnung," etc., 542.

c. Not computed.

TABLE VI. — SUPPLY OF GOLD AVAILABLE ANNUALLY FOR THE MONETARY USE OF CIVILIZED COUNTRIES

Unit: $1,000,000

Year [a]	Excess of world's production over world's industrial consumption	Net gold imports of British India	Balance available for monetary purposes
1890	68.8	18.3	50.5
1891	80.6	7.8	72.8
1892	96.6	− 9.1 [b]	105.7 [c]
1893	107.0	2.1	104.9
1894	128.7	−16.1 [b]	144.8 [c]
1895	139.7	8.2	131.5
1896	142.5	7.4	135.1
1897	176.1	15.9	160.2
1898	221.3	21.1	200.2
1899	233.5	30.6	202.9
1900	178.3	2.7	175.6
1901	181.6	6.3	175.3
1902	220.9	28.4	192.5
1903	253.2	32.2	221.0
1904	269.5	31.5	238.0
1905	297.3	1.5	295.8
1906	309.4	48.2	261.2
1907	315.8	54.3	261.5
1908	354.3	14.1	340.2
1909	353.6	70.3	283.3
1910	343.4	77.8	265.6
1911	347.7	122.5	225.2
1912	342.0	110.3	231.7

a. Production and consumption pertain to calendar years. The imports to India pertain to the fiscal year beginning April 1 of the year indicated and ending the following March 31. *b.* Net exports.

c. Reflects the addition to monetary supplies for this year of the net gold exports from British India.

money. A calculation in 1905 by the head of an Egyptian bureau of stamping placed the amount of gold melted into ornaments annually at about $10,000,000, though government officials did not confirm this "rough guess." [1] Of the three countries, however, British India is most important in this connection. In the years from 1890 to 1900 its net annual imports of the precious metal averaged $8,000,000, and from 1901 to 1912, $50,000,000 (Table VI). While not all the gold retained there is employed industrially, the bulk of it is as definitely lost to the world's monetary supply as if it were so employed. In Table VI, therefore, the net gold imports of British India are deducted from the excess of production over consumption in the arts. The balances resulting indicate roughly the amount free each year for monetary uses if to strictly industrial consumption is added the flow to India.[2]

The effect of this addition is to emphasize what was already apparent. Industrial inroads on gold production were large and increasing before the war. Since the war, in the United States at least, they have been greater than ever before. However unimportant such withdrawals may have been when gold supply was more than sufficient for monetary demands, they merit attention now that this situation no longer holds.

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[1] Mint, *Report on the Production*, etc., 1910, p. 56.

[2] Mr. George Blumenthal of the firm of Lazard Frères estimated the net increment to monetary use in 1912 at about $200,000,000, as compared with the $230,000,000 shown in Table VI. House of Representatives, *Hearings before the Subcommittee of the Committee on Banking and Currency*, February, 1913, p. 706.